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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,313	02/12/2004	Makoto Higami	026035-00009	4085

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EXAMINER

CHU, HELEN OK

ART UNIT	PAPER NUMBER
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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/776,313	Applicant(s) HIGAMI ET AL.	
	Examiner Helen O. Chu	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. No amendments or arguments were additionally filed after Advisory Action dated March 6, 2008.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 8, 2008 has been entered.

Claim Rejections - 35 USC § 103

4. The rejections under 35 U.S.C 103(a), as unpatentable over Diebert et al. (US Patent 3, 442, 715) in view of Joshi et al. (US Patent 5,454,922) on claims 1-5 are maintained.
5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diebert et al. (US Patent 3, 442, 715) in view of Joshi et al. (US Patent 5,454,922).

In regard to claims 1 and 5, the Diebert et al. reference discloses a fuel cell comprising electrode material made of 1-20wt% of carbon black (calculated to be 16wt%; Column 12, Lines 57-60 or Column 16, Lines 10-20 calculated to be 10wt%) supporting a platinum catalyst (Column 5, lines 70-Column 6, Lines 20), an organic liquid containing a dispersion medium with 60-80wt% of organic solvent (Column 3, Lines 70-73) remainder water. The Diebert et al reference states that various alcohols, both (emphasis added) aliphatic and aromatic and both lower and higher boiling than water (Water boils at 100 degrees Celsius) have been found suitable for the invention (Column 4, lines 5-10). Additionally, the Diebert et al. reference adds, mixtures (emphasis added) of organic liquids such as those above listed may also be employed. (Columns 3 and 4, Lines 70-75 and 1-20, 52-54, one of the simplest mixtures include an organic alcohol of higher boiling point and another with lower boiling point than water). The Diebert et al. reference does not disclose the specific amounts of the organic solvent with a boiling point of 100 to 200°C and boiling point of less than 100°C. However, Examples 2-5, 7-9 utilize equal wt amounts of two separate organic solvents and therefore out of 60-80wt % one of ordinary skill can presume that the two organic solvents are in equal weight percents (Example 40/40 wt %). Furthermore, Diebert et al. recognizes that mixtures (emphasis added) of the organic solvents can be employed (Column 4, Lines 53-54) for preparation in crack-free electrodes (Column 3, Lines 65-73). Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to choose the instantly claimed value through process optimization, since it has been held that the general conditions of a claim are disclosed in the prior art, discovering the

optimum or workable values involve only routine skill in the art. See *In re Boesch*, 205 USPQ 215 (CCPA 1980).

Though, the Diebert et al. reference discloses an ion exchange membrane of made of Nafion it does not disclose an electrolyte used as part of the electrode paste, however, the Joshi et al. reference uses a 1-30 wt% electrolyte (Nafion) (Column 4, Lines 45-50) as a binder for the electrodes (Column 2, Lines 16-20). Therefore, it would be obvious to one of ordinary skill at the time the invention was made to incorporate Nafion as disclosed by Joshi et al. to the electrode paste as disclosed by Diebert et al. in order to improve the adhesion of the electrode to the ion-exchange membrane.

In regard to claim 2, It is inherent that since alcohols with boiling points of 100 to 200°C are disclosed by the Diebert et al. reference, the alcohols would inherently have intrinsic properties of a boiling point of 100 to 200°C and a solubility parameter of 7.5 to 13 (cal/mol)^{1/2} because the compound is the same as the recitation of the element in the specification.

In regards to claim 3, the Diebert et al. reference also discloses dispersing agent (Column 4, Line 72) in the electrode paste.

In regards to claim 4, the Diebert et al. reference further discloses a fiber may be included of a conductive material such as carbon.

Response to Arguments

7. Applicant's arguments filed February 19, 2008 of which was addressed by Advisory Action dated March 6, 2008 have been fully considered but they are not persuasive. The Arguments and Response to Arguments are repeated below

Applicant's principal arguments are

A) Applicants' submit that Deibert et al. does not teach or suggest a composition comprising: 1 to 20 weight % of a carbon black supporting a hydrogen reduction catalyst, 1 to 30 weight % of an electrolyte, 1 to 50 weight % of an organic solvent with a boiling point of 100 to 200°C, and 30 to 80 weight % of a water-soluble organic solvent with a boiling point of less than 100°C. Further, Applicants submit that Deibert et al. does not teach or suggest using both "an organic solvent with a boiling point of 100 to 200°C" and "a water-soluble organic solvent with a boiling point of less than 100°C" in combination... For instance, in Examples 2, 3, and 4 of Deibert et al., the disclosed mixture is a composition having two solvents, but both solvents have a boiling point less than 100°C (isopropanol, which has a boiling point of 82°C, and benzene which has a boiling point of 80°C)

B) Applicants submit that the presently claimed invention, which comprises a mixture of "an organic solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C" demonstrates unexpected results. For example, the paste composition of the presently claimed invention unexpectedly is "excellent in storage stability, [and] can give electrodes that have a sufficient pore volume for high generation performance" (specification, page 2, lines 3- 5) (emphasis added). Further, Applicants submit that the presently claimed composition "comprises organic solvents of a specific boiling point... [which] make it possible for the solvent of the paste composition to evaporate at a controlled rate under drying conditions in the electrode production" (specification, page 2, lines 6-9) (emphasis added). Applicants submit that Deibert et al. does not disclose or suggest the unexpected and remarkable effects of having a paste composition for making electrodes which comprises both an organic

solvent with a boiling point of 100 to 200°C and a water-soluble organic solvent with a boiling point of less than 100°C

C) Applicants note the general "rule that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art" (In re Boesch, 617 F.2d 272, 273 (C.C.P.A. 1980). However, Applicants submit that based on the teachings of Deibert et al., the presently claimed invention is not within the skill of the art, because Deibert et al. provides no teaching or guidance of which variable or components are "result effective." In other words, Applicants submit that one of ordinary skill in the art would not be motivated to "optimize" the composition disclosed in Deibert et al., because Deibert et al. does not teach or suggest which components or variables of the composition are important for obtaining improved properties and beneficial results. In particular, Applicants submit that Deibert et al. does not disclose that the presence of the particular combination of an organic solvent with a boiling point of 100 to 200°C, and a water-soluble organic solvent with a boiling point of less than 100°C provides a paste composition with the beneficial results

D) Joshi et al. Joshi et al. merely generally discloses "a fluid-dispensing, electrochemical pump... [which] utilizes an electrochemical cell having a thin-walled, substantially non-porous polymeric ionomer, such as polyperfluoro-sulfonated ethylene, which has one ionic/electronic conducting electrode capable of reducing oxygen in the presence of watts or protons and another electronic/ionic conducting electrode suitable for oxygen evolution" (Joshi et al., col. 3, lines 3-9).

In response to Applicant's arguments please consider the following.

A) These arguments are mere assertions of which the Applicants did not provide any evidence to support the arguments. Please refer to the U.S.C 103(a) rejections. Furthermore, Diebert states "various alcohols..., both with lower and higher boiling than water" (Column 4, Lines 5-25) It is known by one skilled in the art that the boiling temperature of water is 100 C. Column 4, Lines 52- 54 states "mixtures of organic liquids such as those above listed can be employed." It is known to one of ordinary skill in the art that a mixture off organic liquids consist of two or more organic liquids. Additionally the examples used by Diebert et al. reference does not limit the invention to only the organic solvents used in those examples. The Examples used are meant to be exemplary and as stated by the Diebert reference "the invention as illustrated but not limited by the following examples (Column 12, Lines43-47)."

B) The teachings of Diebert would have been obvious that the mixtures would include mixtures of alcohols (organic solvents) of higher than 100C and lower than 100C because the Diebert reference does disclose "various alcohols, both (emphasis added) aliphatic and aromatic and both lower and higher boiling than water (Water boils at 100 degrees Celsius) have been found suitable" for the invention (Column4, lines 5-10). Additionally, the Diebert et al. reference adds, "mixtures (emphasis added) of organic liquids such as those above listed may also be employed." (Columns 3 and 4, Lines 70-75 and 1-20, 52-54, one of the simplest mixtures include an organic alcohol of higher boiling point and another with lower boiling point than water).

The Applicants arguing unexpected results is not commensurate in the scope of prior art rejection. The Applicants must provide further evidence between the instantly claimed invention in contrast to the prima facie case of unpatentability utilizing the Diebert reference. Since the prior art illustrates that the invention is obvious over the Applicants invention and is rejected as

such, the Applicants must show how the Diebert reference is not obvious over the instantly claim invention to obviate the rejection. The demonstration of unexpected results by simply stating for example "excellent in storage stability" is not sufficient to overcome the prior art. The prior art must also have the same "unexpected" results as demonstrated by the Examiner's position because the prior art is obvious over the instantly claimed invention.

C) These arguments are based on assertions of which the Applicants did not provide further evidence to support the Applicants position. The motivation to optimized was stated in the rejection and as repeated "Diebert et al. recognizes that mixtures of the organic solvents can be employed (Column 4, Lines 53-54) for preparation in crack-free electrodes (Column 3, Lines 65-73). Utilizing organic solvents or mixtures of organic solvents would motivate one skilled in the art to produce crack free electrodes and therefore motivates discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art.

D) the arguments on whether the Joshi et al. reference discloses a fluid dispensing electrochemical pump is not commensurate with the scope of the rejections. The Joshi et al. discloses an electrolyte in the electrode paste for fuel cells was known to one of ordinary skill in the art. Furthermore, the Applicants invention uses the same compound as the electrolyte such as Nafion in (page 16, lines 5-10).

Conclusion

Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next

Office action if they had been entered in the earlier application. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor Patrick Ryan can be reached on (571) 272-12922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HOC

/Raymond Alejandro/

Primary Examiner, Art Unit 1795